P.I.E.

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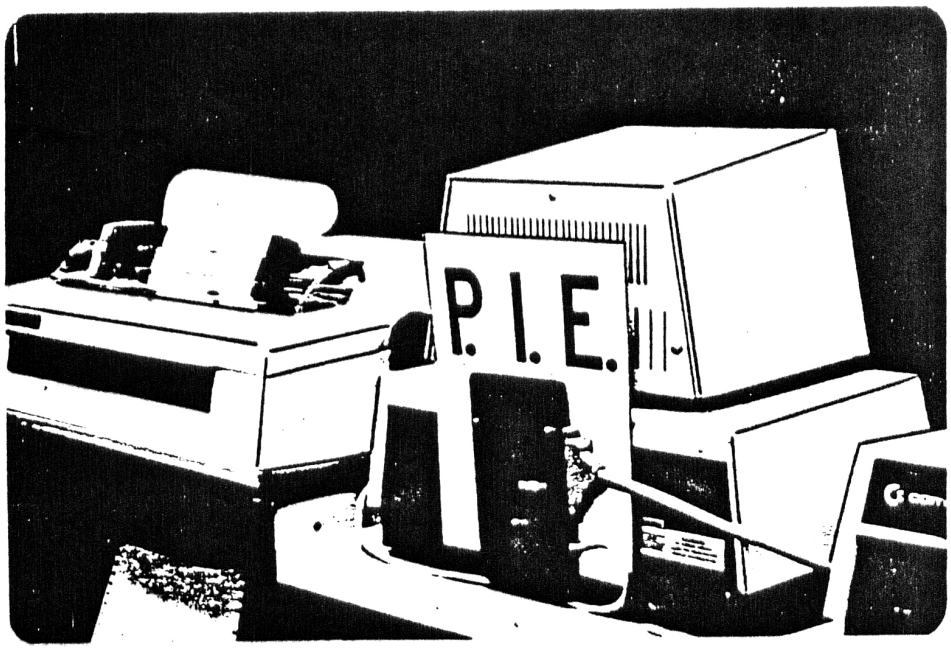
PET/CBM* IEEE-488 TO PARALLEL PRINTERS



LEMDATA PRODUCTS

P.I.E.

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*PET is a trademark of Commodore Business Machines

P.I.E.-C V2

A Description

The P.I.E.-C has three connections used to interface it to the other devices in your system. Please refer to Page A1 for the locations mentioned. One connection is on the rear of the interface. This is a card edge connector that mates with the IEEE-488 port of the PET/CBM. The IEEE-488 port is the card edge of the PET/CBM that is closest to the power switch and cord. This is located at the upper-right side of the P.I.E.-C. It is a card edge just as that used on the PET/CBM. It mates with your IEEE-488 cable from your floppy discs, or other peripheral. The last connection of the P.I.E.-C is provided at the end of the printer cable.

Power for your interface is provided by your printer through the printer cable. This requires that your printer supplies +5v on its input connector. All true Standard Centronics interfaced printers do provide this +5v on connector pin #18. For other printers, it will be necessary to jumper the +5v from some point in the circuit to the connector. Suggestions for doing this are supplied in the notes at the end of this manual for some printers.

Selecting an Address

Please refer to page A1 and notice the location of the DIP switch and the number of each of the 8 switches. Switches #1 through #5 will be used for selecting your device number. A complete list of addresses that are possible and the setting for switches #1 through #5 for those addresses is given on page A2. You may refer to this list to set any device number that you wish your P.I.E.-C to respond to.

When using your IEEE-488 Basic Commands, it is first necessary that a file be opened for a particular device#. Then, when that file number is used in a command, the device# you specified in the OPEN statement will respond.

For example, "OPEN5, 4" is used to specify that file number 5 will be using device# 4. Now if you perform a "PRINT# 5," command, your device# 4 will receive the data you specified (i.e., PRINT# 4, A$; "is my name").

Your interface can respond to any device# between 4 and 30, inclusively. The five left-most switches on the DIP switch are used for address selection. Look at the different addresses as shown on page A2. Device# 4 will be the address of the P.I.E.-C if you set switch #1 through #5 to LO-LO-HI-LO-LO.

Addresses 0 through 3 are used internally in the PET/CBM and are never available on the IEEE-488 port. Address 31 is not valid and if selected will give erratic results.

Switch #6 is not used and makes no connection.

Using your Code Converter ROM

Switches #7 and #8 of the DIP switch are used for controlling the code conversion. Switch #7 is used to enable or disable the ROM. In the LO position, #7 causes the ROM to be enabled. When HI, the ROM is disabled. When the ROM is enabled, switch #7 HI, then switch #8 is used to determine the mode you wish to print in. When switch #8 is HI, then your interface will output the graphics code (just as your video screen does when memory location 59468 is poked to value of 12). When switch #8 is LO, then your interface will output the ASCII lowercase characters (just as your video screen does when memory location 59468 is poked to a value of 14). In summary, to use the Code Converter ROM, switch #7 must be set to LO. If your video is using graphics, then switch #8 should be set to HI. If your video is using lowercase, then switch #8 should be set to LO. If you have any question as to the codes put out by the interface, refer to page A3 where all the codes are listed with the settings of switches #7 and #8 that are needed to provide the various codes.

Please take note that there are times when you need the interface in the graphics

mode even though you will be printing lowercase letters. This is the case when using programs that convert the codes by software. The WordPro programs by Commodore do this software conversion and require that the interface be operated in the graphics mode (that is, switch #8 should be HI).

Making the Connection

Be sure the PET/CBM and your printer are both turned off before making any connections.

Mount your P.I.E.-C to your PET/CBM by pressing the interface onto the IEEE-488 card edge that protrudes from the computer. Remember, the IEEE-488 port is the one closest to the power cord. Mounted in this way, the interface will be left standing straight up and against the back of the computer.

While holding the P.I.E.-C, for support, press your floppy disc cable onto the card edge located at the upper-right side of the interface. Be sure the connector is oriented correctly, that is, the pin# 1 of the connector should be toward the bottom of the interface. Using the cable clamp supplied, support your floppy disk cable against the PET/CBM to prevent it from pulling on the interface.

Now plug the printer cable from the P.I.E.-C into your printer. This completes the hook-up. You are now ready to operate the entire system.

Using OPEN, PRINT#, CLOSE

Set the interface device# to 6 by setting switches #1 thru #5 to LO-LO-HI-HI-LO. Power-on your printer and then your computer. Clear the screen and type the following:

```
OPEN 5,6:  PRINT#5:  CLOSE5                              (Return)
```

Your printer will execute a carriage return. (If it doesn't, go back and check all the connections you made. Then follow the preceding instructions again.)

Now enter:

```
OPEN 5,6:  PRINT#5, "THIS IS A TEST"                     (Return)
```

Now your printer will print - - THIS IS A TEST. Since file number 5 is still open, you only need to enter more print statements to print more on the printer. Enter these for example:

```
PRINT#5, "A B C D E F G H I J"                           (Return)
PRINT#5, "MY PET/CBM LOVES ITS P.I.E.-C"                 (Return)
CLOSE5                                                   (Return)
OPEN 5,4                                                 (Return)
PRINT#5, "TEST IN PROGRESS"                              (Return)
```

This last statement did not print anything to the printer because your last OPEN command did not specify the same device# that your interface is set for (which is #6).

You can check that there was a problem with the previous output by printing the value of the I/O STATUS variable:

```
PRINT ST                                                 (Return)
```

Any value other than 0 indicates that there was a problem with the execution of the last I/O operation.

You can set your P.I.E.-C to accept your last PRINT# statement by simply changing its address to match the one in the OPEN statement (we used #4). So set your interface

to that value by setting switches #1 to #5 of the DIP switch to LO-LO-HI-LO-LO. Now enter the last print statement again:

```
PRINT#5, "TEST IN PROGRESS"                    (Return)
```

This time your printer responded.

When you are finished with a particular file number it should be closed as this is necessary in order to use that file number again. So enter:

```
CLOSE5                                         (Return)
```

Any device# that is specified by an OPEN command in a program can be used as the device# your printer responds to. Just set the DIP switch on the interface to match the number used in the OPEN command. (Remember, only device# 4 thru 30 is put out on the IEEE-488 port.)

Using CMD

To list a program to your printer, the CMD command is used. As with PRINT#, the CMD command uses a file that must have been opened before hand. Enter the following program:

```
10 FORF=0TO100                                 (Return)
20 PRINT# 5,F;" ";                             (Return)
30 NEXTF                                       (Return)
40 PRINT# 5:  END                              (Return)
```

Now clear the screen and enter:

```
LIST                                           (Return)
```

Your program was listed on the video screen. Now enter the following:

```
OPEN 5,4: CMD5:  LIST                          (Return)
```

This time your program was listed out to your printer. Please notice however, that the "READY" is printed on your printer and not on the screen. This is because the CMD command causes all output that follows it to be put out on the device# specified in the OPEN command for the file which was used in the CMD command. In our case, all output will be going to device# 4 (the address of your printer).

The way to clear this condition (that is, to return output to the screen) is to execute a PRINT# command. As an example, enter:

```
PRINT "CMD TEST"                               (Return)
```

Now, although we did not use the PRINT# command, the data (CMD TEST) was output to the printer, device# 4. This is because we have not executed a PRINT# 5 since we executed the CMD5 command. In order to return output to the screen, enter:

```
PRINT# 5                                       (Return)
```

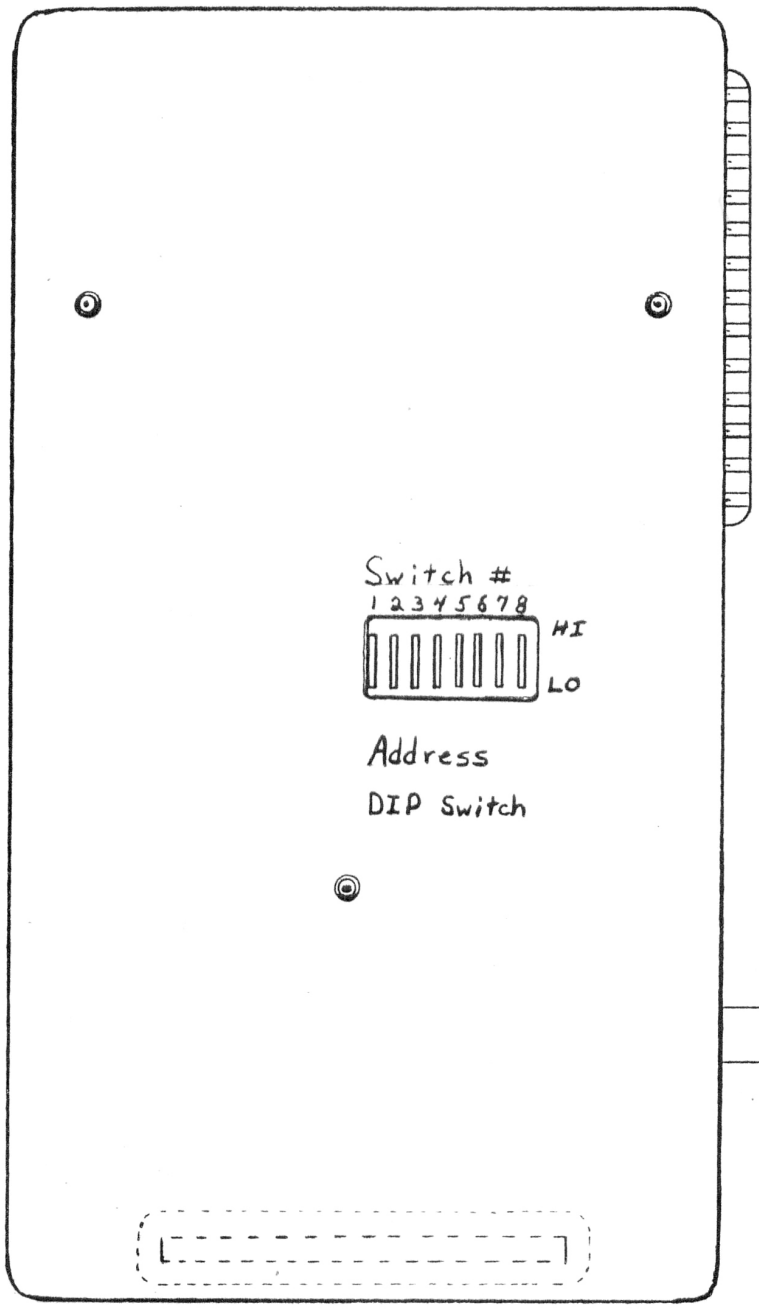
You will now have "READY" printed on the screen and you may now close the file:

```
CLOSE5                                         (Return)
```

SUMMARY

We hope you have found these instructions helpful. Further information about files and 488 Basic commands may be found in the PET/CBM User Manual.

*PET/CBM is a trademark of Commodore Business Machines.



PET/CBM CONNECTOR
(On the back side)

P.I.E.-C DIAGRAM

P. I. E.

SETTING THE ADDRESS

Device# Desired	DIP Switch Position Value of Position	1 (16)	2 (8)	3 (4)	4 (2)	5 (1)
4		LO	LO	HI	LO	LO
5		LO	LO	HI	LO	HI
6		LO	LO	HI	HI	LO
7		LO	LO	HI	HI	HI
8		LO	HI	LO	LO	LO
9		LO	HI	LO	LO	HI
10		LO	HI	LO	HI	LO
11		LO	HI	LO	HI	HI
12		LO	HI	HI	LO	LO
13		LO	HI	HI	LO	HI
14		LO	HI	HI	HI	LO
15		LO	HI	HI	HI	HI
16		HI	LO	LO	LO	LO
17		HI	LO	LO	LO	HI
18		HI	LO	LO	HI	LO
19		HI	LO	LO	HI	HI
20		HI	LO	HI	LO	LO
21		HI	LO	HI	LO	HI
22		HI	LO	HI	HI	LO
23		HI	LO	HI	HI	HI
24		HI	HI	LO	LO	LO
25		HI	HI	LO	LO	HI
26		HI	HI	LO	HI	LO
27		HI	HI	LO	HI	HI
28		HI	HI	HI	LO	LO
29		HI	HI	HI	LO	HI
30		HI	HI	HI	HI	LO

See page A-1 for DIP Switch positions.

LemData Products, P.O.Box 1080, Columbia, Md. 21044

This Code Converter is designed for the P.I.E.-C to output the correct ASCII codes for the codes put out by the PET. It will provide proper decoding of all the ASCII characters used on the PET screen and will not affect the other codes (graphics codes). All codes from 0-255 will be available from the P.I.E.-C.

The following is a list of the PET codes into the P.I.E.-C and the output codes from the P.I.E.-C to your printer.

Mode	PET Code	P.I.E.-C Output	Switch 7 & 8
GRAPHICS	0-255	0-255	LO, HI
LOWER CASE	0-64	0-64	LO, LO
	65-90	97-122	LO, LO
	91-96	91-96	LO, LO
	97-122	193-218	LO, LO
	123-192	123-192	LO, LO
	193-218	65-90	LO, LO
	219-255	219-255	LO, LO

*These codes are for PET/CBMs which require you to shift to get upper case letters.

A FEW WORDS ABOUT USING THE P.I.E.

While printing is being done there will be times when the screen of the PET will blank out. This occurs whenever the computer sends an EOI signal. This is normal and is not a problem. No harm is being done to the P.I.E. or the PET.

Note that the PET outputs a carriage return (ASCII 13) and a line feed (ASCII 10) whenever it is allowed to terminate a line. If your printer recognizes both the carriage return and the line feed ASCII characters, then your printer should be set so it does not do an automatic line feed when it receives a carriage return. If it does do an automatic line feed on receiving a carriage return then also responds to the receipt of a line feed character, your printer will double space between lines of printing (once for the carriage return and once for the line feed). If you cannot disable the "line feed on carriage return" feature of your printer, you may want to end all of your print statements by sending a specified carriage return followed by a semi-colon (ie., PRINT #5, "TEST"; CHR$ (13);). Be sure the final semi-colon is present or the PET will still terminate the statement with a carriage return, line feed sequence.

PERIPHERAL NOTES

POWER TO THE P.I.E.-C THROUGH THE PRINTER CABLE

LemData Products' cables will use the following definitions for supplying power to the P.I.E.-C from the printers listed below.

Centronics Standard Interface. Although there are many printers claiming to have this interface not all of them implement the +5v onto the connector. For those printers that truly have this +5v available, it is located on pin# 18 of the 36-pin connector. Some of the printers that provide this power are the Centronics 700 series, the Anadex printers and some others.

ALL OF THE FOLLOWING PRINTERS REQUIRE A JUMPER WIRE INSTALLED TO PROVIDE +5v.

NEC Spinwriter. Remove the platen and then the full top cover. Locate pin# 18 on the data connector which is on the right side of the printer. This pin should be at the very bottom of the connector. Solder one end of the jumper wire to it. The other end will be connected to the first PC board in the Spinwriter card cage. There is a pin marked +5v. You may solder to this pin directly or use a connector on the end of the jumper and just push it onto this pin.

Epson MX-80. Remove the cover and then the small PC board on the left. There are two screws that mount this board and it also plugs into two connectors on the main board. Still looking at the unit from the front, solder one end of the jumper wire onto the rightmost pin on the top row of the backside of the data connector (which is located under the board that you just removed). Now insert the other end of the jumper wire into connector CN3 (forward and to the right) at pin location #16. This connector is marked on the board and on the parts layout diagram in the manual.

Integral Data (Paper Tigers). Locate the input data connector on the right side of the printer. Now find pin# 21 and solder one end of the jumper wire to this pin. On the model 440 the other end of the wire will go to the end of R17 that is nearest to the top of the printer. On the models 460 and 560, the +5v may be found on pin# 1 of the connector J2 on the power supply board. On other models it will be necessary to find a convenient location of +5v directly from the power supply.